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10/692,154	10/22/2003	Ching-Yu Hung	TI-35348	9150
23494 7590 06/03/2009 TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			EXAMINER WANG, CLAIRE X	
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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/692,154
Filing Date: October 22, 2003
Appellant(s): HUNG ET AL.

Carlton H. Hoel (Reg. No. 29,934)
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 09/12/2007 appealing from the Office action mailed 04/19/2007.

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In response to the remand from the Board of Patent Appeals and Interferences dated April 17th, 2009, the Examiner's Answer mailed on January 23rd, 2009 is hereby vacated in favor of the Examiner's Answer herein.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeal and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

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(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

A new ground of rejection of claims 1-5 under 35 USC 101 is advanced herein below.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,466,333	Schoolcraft et al.	10-2003
6,049,400	Vondran, Jr.	4-2000
4,275,413	Sakamoto et al.	6-1981
6,697,520	Hemingway	2-2004

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

NEW GROUNDS OF REJECTION

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-5 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent¹ and recent Federal Circuit decisions² indicate that a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. Claim 1 is a method claim that does not define a transformation and does not

¹ *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

² *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

include language that ties to another statutory class, thus it is rejected under 35 U.S.C. 101. Claims 2-5 do not overcome the deficiencies of claim 1 and therefore are also rejected under 35 U.S.C. 101.

EXISTING GROUNDS OF REJECTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Schoolcraft et al. (US 6,466,333 B2).

As to claim 1, Schoolcraft et al. (from this point forward shall be referred to as Schoolcraft) teaches a method of tetrahedral interpolation (Col. 1, lines 8-11), comprising the steps of: (a) receive a color space input point (pixel of the input image; Col. 11, line 43); (b) compute a base point (base address; Col. 11, line 58) and three differentials (Col. 11, lines 65-67; Col. 12, lines 1-3)) for said input point; (c) compare said three differentials (Table V); (d) compute tetrahedron vertices from the results of steps (b) and (c) (Table V), a first one of said vertices being said base point (look-up table 34; Col. 6, lines 30-32); (e) find output values for each of said vertices (Table I; Col. 6, lines 34-59); (f) compute an interpolated output value for said input point as the

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sum of the output value of said base point plus the inner product of said differentials in size order with corresponding differences of said output values for said vertices (Table III).

As to claim 2, Schoolcraft teaches wherein: (a) said output values of step (e) are a single color value for each vertex (look-up table 34 has a cube output representing each input; a cube has 8 vertices and therefore can use one of its vertices to represent an input value; Col. 6, lines 4-10 and lines 23-28).

As to claim 3, Schoolcraft teaches wherein: (a) said output values of step (e) are three color values for each vertex (look-up table 34 has a cube output representing each input; a cube has 8 vertices and therefore can use three of its vertices to represent an input value; Col. 6, lines 4-10 and lines 23-28).

As to claim 4, Schoolcraft teaches wherein: (a) said output values of step (e) are four color values for each vertex (look-up table 34 has a cube output representing each input; a cube has 8 vertices and therefore can use four of its vertices to represent an input value; Col. 6, lines 4-10 and lines 23-28).

As to claim 5, Schoolcraft teaches wherein: (a) said output values of step (e) are six color values for each vertex (look-up table 34 has a cube output representing each

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input; a cube has 8 vertices and therefore can use all 8 of its vertices to represent an input value; Col. 6, lines 4-10 and lines 23-28).

As to claim 6, it differs from claim 1 only in that claim 1 is a method claim whereas claim 6 is the system of claim 1. Thus claim 6 is analyzed previously discussed as respect to claim 1 (Fig. 1 shows the system Schoolcraft's invention).

(10) Response to Argument

The following discussion relates to the rejection of claims 1-6 under 36 U.S.C. 102 (b) as being anticipated by Schoolcraft ET al. (6,466,333)

A1. Appellant's argument:

- i. The appellant argues (page 4 of the Appeal Brief) "Schoolcraft Table III does not suggest an inner product of the differentials in size order with the corresponding differences of vertex outputs. Rather, Table III just lists the six possible relative sizes of the three differentials and the corresponding interpolation in terms of an inner product of differences of differentials with vertex outputs; that is, Table III has difference of differentials, whereas the claim is differences of vertex outputs."

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A2. Examiner's response:

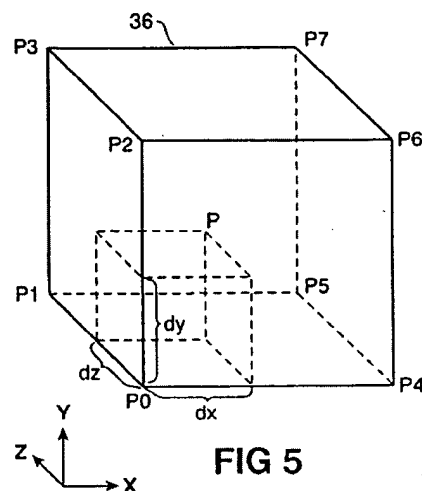
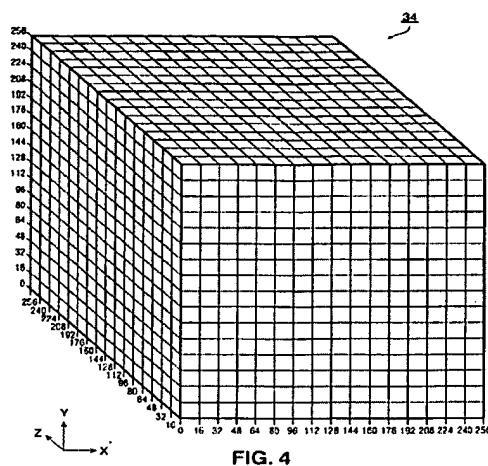
i. The Examiner respectfully disagrees with the Appellant's argument due to the following reasons:

(1) Examiner would like to present Table III of Schoolcraft et al.

TABLE III

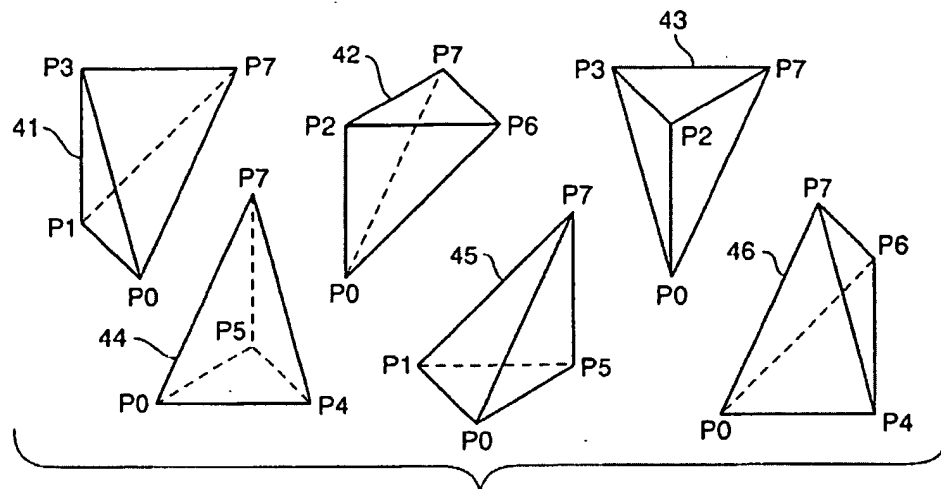
Conditional statements and corresponding equations for tetrahedral interpolation.	
Conditional Statement	Interpolation Equation
if $dz \geq dy > dx$ (P is in tetrahedron 41) then	$V = [(dx)V0 + (dy - dx)V3 + (dz - dy)V1 + (16 - dz)V7]/16$
if $dy > dx > dz$ (P is in tetrahedron 42) then	$V = [(dz)V0 + (dx - dz)V6 + (dy - dx)V2 + (16 - dy)V7]/16$
if $dy > dz \geq dx$ (P is in tetrahedron 43) then	$V = [(dx)V0 + (dz - dx)V3 + (dy - dz)V2 + (16 - dy)V7]/16$
if $dx \geq dz > dy$ (P is in tetrahedron 44) then	$V = [(dy)V0 + (dz - dy)V5 + (dx - dz)V4 + (16 - dx)V7]/16$
if $dz > dx \geq dy$ (P is in tetrahedron 45) then	$V = [(dy)V0 + (dx - dy)V5 + (dz - dx)V1 + (16 - dz)V7]/16$
if $dx \geq dy \geq dz$ (P is in tetrahedron 46) then	$V = [(dz)V0 + (dy - dz)V6 + (dx - dy)V4 + (16 - dx)V7]/16$

it is noted that each interpolation equation corresponds to a conditional statement. V represents an output color component value (e.g., C, M or Y value) at point P, and V0 through V7 represents the corresponding entry (e.g., C, M or Y value) in look-up table 34 for points P0 through P7 (Col. 7, lines 61-65).



This reads on the claimed "size order" of claims 1 and 6, since size order may be in any order according to the differential's size. Table III clearly shows the different possibilities of dx, dy, and dz. For example, if $dz \geq dy > dx$ then there is a corresponding interpolation equation associated with the condition. The language of claims 1 and 6 do not mention that size order need to be from large to small, small to large, or any other possible combinations; it simply states "size order".

(2) It is noted that Schoolcraft teaches the interpolation equations produces vertex outputs. In Fig. 6, Schoolcraft clearly demonstrates examples of tetrahedral interpolations where vertices are in use.

**FIG 6**

Note that P0-P7 are the same vertices listed in Fig. 5, shown in the above argument. Schoolcraft also teaches "the output color component values are calculated by weighting the entries in look-up table 34 that correspond to the appropriate tetrahedron by the distances of the input color component values from the vertices of the tetrahedron." (Col. 7, lines 53-56)

B1. Appellant's argument:

- i. The appellant argues "the computation of Schoolcraft; namely,

$$V = [(dx)V_0 + (dy \ dx)V_3 + (dz \ dy)V_1 + (16 \ dz)V_7]/16$$

Could be rearranged to look like the claim 1 inner product; namely,

$$V = dx(V_0 \ V_3)/16 + dy(V_3 \ V_1)/16 + dz(V_1 \ V_7)/16 + V_7$$

However, this is no surprise: Schoolcraft and claims 1 and 6 both perform tetrahedral interpolation and thus have to get the same answer. But claims 1 and 6 are directed to the method of computing the interpolation; and the Examiner's rearrangement is just hindsight." (see Pages 4-5 of Appeal Brief)

B2. Examiner's response:

- i. The Examiner respectfully disagrees with the Appellant's argument due to the following reasons:

- (1) Examiner would like to direct attention to Appellant's two equations (pages 4-5 of Appeal Brief), namely,

$$V = [(dx)V_0 + (dy \ dx)V_3 + (dz \ dy)V_1 + (16 \ dz)V_7]/16$$

converting to:

$$V = dx(V_0 \ V_3)/16 + dy(V_3 \ V_1)/16 + dz(V_1 \ V_7)/16 + V_7$$

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The above two equations are not mathematically equivalent to each other.

The actual equation the Examiner quoted from Schoolcraft's teachings is:

$$V = [(dx)V0 + (dy - dx)V3 + (dz - dy)V1 + (16 - dz)V7]/16$$

Which may be rearranged to look like the following using simple math:

$$V = dx (V0 - V3)/16 + dy (V3 - V1)/16 + dz(V1 - V7)/16 + V7$$

(2) Schoolcraft's invention is directed towards tetrahedral interpolation by which an interpolated color output value is interpolated from values in a color look-up table based on a color input value (Col. 1, lines 8-11). This is a method for tetrahedral interpolation which requires computing the interpolation equations. Thus it is in the same direction as the claimed invention.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section (9) above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the new ground of rejection:

(1) **Reopen prosecution.** Request that prosecution be reopened before the primary examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of rejection. A request that complies with 37 CFR 41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

(2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

Respectfully submitted,

Claire X. Wang

/Claire X. Wang/ Examiner, Art Unit 2624

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A Technology Center Director or designee must personally approve the new ground(s) of rejection set forth in section (9) above by signing below:

Mark Powell

Director, Technology Center 2600

Conferees:

Matthew Bella (SPE)

/Matthew C Bella/

Supervisory Patent Examiner, Art Unit 2624

Brian Werner (SPE) signing for *Jingge Wu* (SPE)

/Brian P. Werner/

Supervisory Patent Examiner, Art Unit 2624

A handwritten signature in cursive script, appearing to read "Mark Powell".

DIRECTOR 2600